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1. Historical Background

a. In order to develop a picture of the present-day Yugoslav aircraft industry [redacted] advisable to review the status of this industry prior to WWII. 25X1

(1) Prior to WWII Yugoslav aircraft industry was small, even by European standards. It was partially government owned. The greater part, however, was owned by private concerns and individuals. The industry was small not only in physical outlay or production, but in research and development -- particularly in original creations. Very few original designs of great importance were realized.

(2) Very little damage resulted to the aircraft establishments of Yugoslavia during WWII. The industry was and is now [1954] concentrated primarily in Belgrade and its suburbs Zemun and Rakovica. However, the largest Yugoslav aircraft factory, government owned, was located in Kraljevo, an industrial and railway center about 120 miles south of Belgrade. 25X1

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b. The Kraljevo Factory

(1) The Kraljevo factory occupies an area of 80 to 100 hectares [198 to 247 acres]. Appurtenances at this plant include air force barracks and full storage as well as unpaved runways.

(2) The plant was equipped with machinery of French origin and tooling for production under license of the Breguet 19 (an obsolete French reconnaisance and light bomber plane) which the Yugoslavs had modernized into types 197 and 198. 25X1

(3) The capacity of the plant was quite large but unfortunately [redacted] the plant never worked to capacity and that a few years prior to WWII work was primarily confined to overhaul and repair. 25X1

(4) No research or development took place at Kraljevo with the exception of minor alterations and changes of the Breguet 19. This research was necessary in order to install larger motors on the Breguet.

c. The Rakovica Factory

(1) Prior to WWII the Gnome et Rhone K14 was in production at Rakovica (a suburb eight miles south of Belgrade).

(2) The engineering staff at Rakovica was small. It was headed by Predrag Zrnich who was at that time considered one of the most talented aeronautical engineers in Yugoslavia. [redacted] 25X1

(3) Predrag Zrnich was assisted at Rakovica by a younger brother Nenad and Dobrivoj Savich. Both of these men took their education and Mechanical Engineering degrees from the University of Belgrade. Savich also took some graduate work in France prior to WWII. All three of these men at one time or another prior to WWII bore the title of Chief Engineer at various factories. When WWII began all three were at Rakovica.

(4) In early post-WWII years Rakovica was engaged only in repair work for the very poor Yugoslav Air Force and for USSR air wings stationed in Yugoslavia.

d. Industrija Motora [IM] of Rakovica

(1) Prior to WWII the Industrija Motora [Motor Industry] of Rakovica was considered a private enterprise. Nevertheless, the Yugoslav Government owned a considerable number of shares in the factory.

(2) The IM plant occupies about five hectares [12.35 acres]. [redacted] the buildings were modern and well equipped with machinery and facilities for the production of air cooled engines for all sizes of aircraft. During pre-WWII days production was concentrated on the Jupiter 500 HP star engine and the Gnome et Rhone K-14 double (800 HP) star engine -- both of French design. 25X1 25X1

(3) No research or development of new aircraft engines took place at IM.

(4) Immediately after WWII IM was engaged in repair and overhaul of airplane engines for the USSR. (Actually the aircraft engine plant was completely under USSR control.)

(5) In addition to aircraft work IM produced a number of trucks prior to WWII and immediately thereafter. In 1946 and 1947 IM produced approximately 100 model RN-14 three ton trucks for Czechoslovakia. Such production, of course, ceased after Yugoslavia broke with the Cominform in June 1948.

(6) In pre-WWII days the Chief Engineer and Technical Director (a graduate of the University of Prague) was Emil Matich. After WWII [1946 and 1947] Dobrivoj Savich served as Chief Engineer in charge of truck production.

e. Vlaykovich Factory

(1) About one mile south of IM in Rakovica is another small aircraft factory. Prior to WWII this plant produced air cooled Valter 120 HP Star aircraft engines. This installation is called Vlaykovich Airplane Factory of Belgrade. The capacity of this plant was sufficient to satisfy the Yugoslav military demand for training plane engines. Engines produced there were of Czech design.

(2) Vlaykovich factory proper is a small establishment situated not far from the center of the city of Belgrade. It occupies one large city block. Before WWII Vlaykovich produced mostly training planes of wooden and metal construction.

(a) During the pre-WWII step-up in aircraft development and production Vlaykovich had established a sound design section but the ensuing war brought about its disintegration. [redacted] the design section (prior to WWII) was headed by Chief Engineer (fnu) Paroshki. In early post-WWII years Vlaykovich produced wooden bodies for IM trucks and furniture for domestic use. Engineer Paroshki was at Vlaykovich as late as 1947.

f. Zemun and Ikarus

(1) Zemun is a suburb north of Belgrade situated between the Sava and Drava rivers. The only really modern airport in Yugoslavia is the International Airport located at Zemun. To the east of Zemun lies the factory and airfield of Ikarus. They lie adjacent to theInternational Airport but are separated by a highway.

(2) Ikarus was the largest private aircraft industry in pre-WWII Yugoslavia and no doubt is still the most important aircraft enterprise in the country -- regardless of what it may be named today [1954]. Prior to Nazi occupation of Yugoslavia Ikarus under UK license produced light Bristol Blenheim bombers and three-engine Spartans -- light passenger aircraft. Both planes were constructed entirely of metal.

(3) The Ikarus factory was well equipped with machinery for the manufacture of both metal and wooden planes.

(4) This plant up to 1941 engaged in its own design and development also for Vazduhopbovni Institut [VI] of Yugoslavia. Some prototypes for VI (Air Force Institute) such as IK2 and IK3 (fighter planes) and OLUY (a light high speed two engine bomber) were built by Ikarus.

Incidentally, the IK3 (in my estimation) was equal to or superior to any fighter plane of 1940. When Yugoslavia was attacked in 1941 by the Germans Ikarus had produced 20 IK3 fighters. During the short air war which developed these 20 aircraft showed a remarkable superiority to the Messerschmidt T09.

(5) In 1947 and 1948 Ikarus was engaged in the development of a light plane designed for short strip (runway) operations. It was fashioned after the German Storch and was intended to serve as an ambulance and supply plane in the more mountainous areas of Yugoslavia. The designing engineer of this plane was Djordje Petrovich Brale.

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in 1947 Brale was doing research in both metal and woods for wing construction. (Yugoslavia was endowed with excellent wood. Her difficulty lay in producing top grade metals for small precision parts. This difficulty was due primarily to insufficient precision type machinery.)

(6) In 1947 Yugoslavia purchased 150 Fairchild Ranger engines from US surplus stocks. US literature relative to various types of wing construction was also procured.

(8) Prior to WWII Ikarus owned a small plant at Novi Sad, a town located on the Danube River about 60 miles north of Belgrade. Activity at this plant was confined to the construction of plywood trainer sea-planes for the Yugoslav Navy.

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(9) A small Hispano-Suizza plant existed in Zemun. It was used solely to overhaul Hispano-Suizza engines which were used by the Yugoslav Air Force.

(10) A number of small-parts shops exist in the neighborhood of the International Airport in Zemun.

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6. Zmay Factory

(1) Zmay is located about one mile to the east of Ikarus, in Zemun's downtown section, several city blocks south of the buildings of Komanda Vazduhoplovstva [Air Force Headquarters].

(2) This plant should be the second aircraft factory in importance in Yugoslavia both in capacity and in modern facilities.

(3) Up to WWII it produced (under UK license) Hawker Hurricane fighters. Zmay had a well organized design bureau which satisfied her own requirements. Additional design and developmental work were done for Vazduhophovni Institute.

2. Aeronautics After WWII

a. The material submitted above represents to a great extent the substance of Yugoslav aircraft industry which Tito inherited from pre-Communist

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Yugoslavia. The rather long explanation was necessary in order to measure with the proper yardstick the value of present-day [1954] institutions, industry, and personnel of that country -- particularly since we use such expressions as "scientists" and "research". [redacted] pre-WWII technical schools of university rank in Yugoslavia were confined to Belgrade, Zagreb, and Ljubljana. Not a single university in Yugoslavia had a department of aeronautics or aeronautical engineering. In fact no special subjects in aeronautics were to be found among the scientific curriculums of these schools.

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b. Men with General Mechanical Engineering or Technical Engineering degrees were the source of employment by both the aircraft industry and the Yugoslav Air Force. Some of this personnel had some foreign specialization, but very few had any technical foreign schooling.

c. After WWII a special faculty and department for aeronautics was organized at Belgrade. Since Yugoslavia had no aeronautical schools until 1947, the competency of her present-day university departments in aeronatuics is questionable. Quality of personnel engaged in teaching aeronautics is problematical, particularly since a large number of able men didn't return after Communism was established. No doubt there are talented, gifted, and enthusiastic men in the country but something else is also necessary. This is best illustrated by the fact that original experimentation with jet aircraft began immediately after WWII. The first jet aircraft of Yugoslav origin, designed by VTI and built by Ikarus, was formally christened at a ceremony conducted by Tito personally only recently [early 1954]. By Yugoslav admission this is a small craft and is so christened. It was baptized "Mali" which in Yugoslav means "small". It is reportedly powered by a low output [redacted] jet engine. Its theoretical top speed is 550 kilometers per hour (350 miles per hour) a speed no greater than that of the propellor driven IK3 produced in 1940.

d. Vazduhoplovni Institut [Aeronautical Institute]

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(1) In the middle thirties the Komanda Vazduhoplovstva [Air Force Command] organized VI, the Aeronautical Institute in Zemun. It was located at the headquarters of KV [the Air Force Command]. Pre-WWII designers who worked at VI were:

(a) Lyubomir Ilich
(b) Kosta Sivchev
(c) Predrag Zrnich
(d) Dushan Radoykovic

(2) VI also engaged in study and research in aircraft technology, armament, electronics and fuel. Personnel who engaged in such activity were:

(a) Bora Terzich
(b) Aleksandar Zduyich
(c) Boza Viro
(d) Milan Stankovich
(e) Stanislav Mishkovich

The above were all young and able engineers.

(3) Immediately after WWII when nationalization of Yugoslav private industry was in full swing, the Savezno Ministarstvo Industrie [Federal Ministry of Industry] was divided into several parts called Glovne Uprave [Chief Administrations] each concerned with a specific segment of industry. Among these divisions was created Glovna Uprova Vazduhoplovne Industrie [Chief Administration of the Aircraft Industry]. This organization,

referred to as GUVI, was later transferred to the Ministry of National Defense because its activities were deemed as vital to the national defense of Yugoslavia. GUVI's roll up to this time was the coordination of production and the distribution of material and personnel -- all very scarce up to 1948.

(4) VTI [redacted] is now /1954/ strictly a technical institution and serves as a centralized research development, and design bureau for all Yugoslav industry. Centralization was a general trend in all industries and economy in the early post-war years. Reasons for such centralization were ideological and practical. [redacted] However, later in 1951 and 1952, a general trend toward decentralization appeared. It had become obvious that clumsy administration had thwarted Yugoslav industrial progress by absorbing for itself a large surplus of skilled personnel. 25X1 25X1 25X1

(5) GUVI was not decentralized because the aircraft industry is small and is essentially concentrated in the Belgrade area and because it is under the Ministry of National Defense. The general [redacted] who in 1950 headed GUVI was strictly a political personage, a watch-dog (so to speak) for the party. In all probability he is a person with very little education, certainly with no technical education. If he resembles Directors of other Glovne Uprave /Directors of Administration/ he is simply an individual who looks at business and industrial management through the prism of Marxist ideology rather than the manner of a trained administrator. 25X1

(6) VTI was organized in Zemun as a successor to VI in order to concentrate on a limited amount of personnel capable of doing creative research and work. The Aeronautical or Planning Bureau and Zemun Aeronautical Institute are in all probability misnomers for VTI.

e. Panchevo

(1) If some offices of VTI have been located at Panchevo, this is due in all probability to the fact that there was insufficient floor space at Zemun at the time. There are no objective reasons to locate this Institute at Panchevo because:

(a) An institution for research and development in aircraft requires technical facilities. None exist at Panchevo.

(b) The well equipped factories of Ikarus and Zmay in Zemun (near the International Airport) possess many small shops and accessories.

(c) Chemical laboratories and testing laboratories are all located at Zemun in the buildings of Komanda Vazduhophovstva /KV/. No such laboratory facilities are available at Panchevo.

f. Zarkovo

(1) Mentioning Zarkovo in connection with VTI puzzles me/for the same reasons as Panchevo. Zarkovo is a small village from eight to ten miles west of Belgrade. It is situated on a group of small hills in a swamp area near the Sava River. Zarkovo is connected with Belgrade by a narrow gauge railway line and a highway. The first Five Year Plan which began in 1947 destined Zarkovo as the site for a large machine tool factory. That factory was completed in 1952. To my knowledge nothing related to the aircraft industry ever took place in Zarkovo. [redacted] exclude the possibility that for some unknown reason, parts of VTI activity may have been moved to Zarkovo.) 25X1

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g. Sombor

(1) No place in Yugoslavia called Somor [redacted] this is a misspelling of Sombor, a town some 120 miles northwest of Belgrade and only 25 miles south of the Hungarian border. Sombor is a totally unprotected town geographically since it lies on a wide and open plain which would be readily accessible to foreign occupation. Unless Tito is much friendlier with Cominform countries [redacted] it is unlikely that he would permit anything of such importance to be located in an area so defenseless as Sombor, or for that matter so close to the border. When the Germans occupied Sombor during WWII they constructed an operation airfield and barracks. These were left intact when the Germans retreated from Yugoslavia.

(2) When the Germans retreated during WWII they left behind a small number of slightly damaged airplanes, particularly in Nezovisna Drzova Hrvotska /Independent State of Croatia/. In late 1944 and early 1945 a few Stormoviks were received from the USSR. Later a few propeller driven MIGs were also obtained. This was the inception of the post-WWII Yugoslav Air Force. Originally air corps personnel were recruited from reserves and prewar professionals. In order to develop an air corps which might be politically reliable the Yugoslav Government began to assign young indoctrinated personnel to the air corps. The reserves and prewar professionals were gradually discharged. The importance of Sombor lies in the fact that a Pilotska Shkola /Pilot School/ was erected at Sombor. One of the instructors at Sombor Pilot School is Yesha Nikolich. [redacted] he was a pre-WWII Yugoslav transport pilot.

h. Control of Personnel

(1) In all Yugoslav industry including aviation political appointees are assigned to the more responsible positions. Such personnel are known to everyone. In some cases they are inept and misplaced. In addition to the well known and obvious Communist personnel the government manages to plant a few covert personnel in the more important industries. Such personnel are expected to report on the activity of all other workers. This impedes independent thinking and thwarts individual initiative.

(2) An employee may be transferred to any job in any area if the government deems it necessary.

(3) The real power which holds all employees in line in Yugoslav industry is the Sindikati /Trade Unions/. Through its unions Sindikati controls all sources and types of laborers.

(4) There have been rumors that German experts in science had entered Yugoslavia in the past. [redacted] Up to 1948 it was impossible for the USSR which was in dire need of technical personnel wouldn't permit it. Some German scientists may have entered after 1948 and affiliated with VTI but such personnel wouldn't be top flight for the Yugoslav Government couldn't possibly compete financially with the major powers including the USSR.

i. Conclusion

(1) [redacted] in the above report [redacted] would appear [redacted] to deprecate and underrate Yugoslav aeronautical

endeavor -- particularly her scientific and technical staffs. That wasn't purpose for many of the Yugoslavs associated with science and technics are talented and capable but conditions and circumstances in Yugoslavia are such that they have no real possibility to develop. Some of them lost considerable time due to years of imprisonment in Germany during WWII.

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